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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/967,048	09/28/2001	Athanasios A. Kasapi	15685P108	4810

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BLAKELY SOKOLOFF TAYLOR & ZAFMAN
12400 WILSHIRE BOULEVARD
SEVENTH FLOOR
LOS ANGELES, CA 90025-1030

EXAMINER	
NGUYEN, KHAI MINH	
ART UNIT	**PAPER NUMBER**
2687	

DATE MAILED: 09/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/967,048	KASAPI, ATHANASIOS A.	
	Examiner	Art Unit	
	Khai M. Nguyen	2687	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 June 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 September 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office Action is response to Amendment filed on 6/13/2005

Claims 1-15 are pending.

Response to Arguments

2. Applicant's arguments with respect to claims 1-15 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Shattil (U.S.Pub-20040141548).

Regarding claim 1, Shattil teaches a method (fig.1, paragraph 0051) comprising:

receiving information for transmission to a receiver (fig.2, 5a, paragraph 0096, 0121) ; and

generating a plurality of sub-carriers to redundantly transmit the information to a user over a multi-carrier wireless communication channel (fig.7-8a, paragraph 0149-0150), wherein each of the sub-carriers is modified by a set of complex weights to ensure that each of the sub-carriers of the wireless communication channel propagates along a different physical path to the receiver (fig.6, paragraph 0140-0143).

Regarding claim 2, Shattil teaches a method according to claim 1, wherein each element of the set of complex weights scales one or more of a sub-carriers amplitude and/or phase at an associated transmission antenna (fig.1a-1b, 6, 8a, paragraph 0051-0052, 0140).

Regarding claim 3, Shattil teaches a method according to claim 1, wherein developing a set of complex weights (fig.1a-1b, 6, 8a, paragraph 0051-0052, 0140) comprises:

choosing substantially different weights for each sub-carrier sharing information (fig.1a-1b, paragraph 0051-0052); and

iteratively repeating until all sub-carriers have been modified (paragraph 0158).

Regarding claim 4, Shattil teaches a method according to claim 3, wherein the substantially different weights are chosen to be orthogonal to the others (fig.1a-1b, paragraph 0049-0052).

Regarding claim 5, Shattil teaches a method according to claim 3, wherein developing a set of complex weights (fig.1a-1b, 6, 8a, paragraph 0051-0052, 0140) comprises:

selecting weight vector(s) to be applied to each of the sub-carriers from a pre-determined set of weight vectors (fig.1a-1b, 6, 8a, paragraph 0051-0052, 0140).

Regarding claim 6, Shattil teaches a method according to claim 1, further comprising:

transmitting the modified sub-carriers through one or more antenna(e) to the receiver (fig.2, paragraph 0071).

Regarding claim 7, Shattil teaches a transceiver comprising:

a diversity agent (fig.7-8a, paragraph 0149-0150), to selectively develop and apply a set of complex weight values to each of a plurality of signals (fig.1a-1b, 6, 8a,

paragraph 0051-0052, 0140), each corresponding to a sub-carrier of a multi-carrier communication channel (paragraph 0051-0052), to introduce spatial diversity between such sub-carriers (paragraph 0072-0073); and

a transmit module (fig.2), coupled with the diversity agent, to receive the modified sub-carriers and transmit the signals to generate a multi-carrier communication channel with intra-channel spatial diversity (fig.2, 8a-8b, paragraph 0150, 0153-0154).

Regarding claim 8, Shattil teaches a transceiver according to claim 7, wherein the plurality of signals received from at the diversity agent are baseband signals (paragraph 0154-0155).

Regarding claim 9, Shattil teaches a transceiver according to claim 7, wherein the multi-carrier communication channel is comprised of a plurality of sub-carrier signals (fig.1, paragraph 0051-0052), each having a disparate set of complex weights introduced at a baseband of the sub-carriers to effect the spatial diversity between the sub-carriers (paragraph 0058,0071).

Regarding claim 10, Shattil teaches a transceiver according to claim 7, wherein each of the set of complex weights are comprised of a plurality of weight values each

associated with one of a plurality of antennae comprising an antenna array through which the sub-carriers are transmitted (paragraph 0071, 0140-0143).

Regarding claim 11, Shattil teaches a transceiver according to claim 10, wherein the diversity agent develops the set of complex weight values for a given baseband signal to be maximally orthogonal complex weight values applied to another baseband signal (paragraph 0049-0050, 0071, 0140-0143).

Regarding claim 12, Shattil teaches a transceiver according to claim 10, wherein the diversity agent develops the set of complex weight vectors for a sub-carrier that are substantially different from weight vectors modifying other sub-carriers that include at least a subset of information carried by the sub-carrier (paragraph 0049-0052, 0071, 0140-0143).

Regarding claim 13, Shattil teaches a transceiver according to claim 7, wherein the transmit module up converts and amplifies each of the modified baseband signals to generate a plurality of spatially diverse sub-carriers (paragraph 0051-0052, 0058,0071).

Regarding claim 14, Shattil teaches a transceiver according to claim 13, wherein the transmit module transmits each of the sub-carriers to one or more receiver(s) (paragraph 0051-0054, 0058,0071).

Regarding claim 15, Shattil teaches a transceiver according to claim 7, further comprising:

a memory having stored therein content (paragraph 0051); and control logic, coupled to the memory, to access and process at least a subset of the content to implement the diversity agent (fig.1, paragraph 0051-0052, 0203).

Citation of Pertinent Prior Art

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Crawford et al. (U.S.Pub-20030002471) discloses Method for estimating carrier-to-noise-plus-interference ratio (CNIR) for OFDM waveforms and the use thereof for diversity antenna branch selection.

Shapira (U.S.Pat-6697641) discloses Method and system for improving communication.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khai M. Nguyen whose telephone number is 571.272.7923. The examiner can normally be reached on 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lester Kincaid can be reached on 571.272.7922. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Khai Nguyen
Au: 2687

8/22/2005

9/6/05

LESTER G. KINCAID
SUPERVISORY PRIMARY EXAMINER